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STATUS REPORT

Forest Health Monitoring

Fiscal Year 1991



NORTHEASTERN AREA
State and Private Forestry

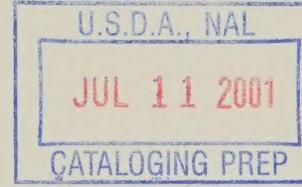
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Introduction

The 20 state Northeastern Area (which includes the Northeastern and North Central Forest Experiment Stations) encompasses 163 million acres of forest land and 111 million people. Forest resources in this region are of tremendous value, not simply for forest products, but also for recreation, wildlife, fisheries, and aesthetics associated with the use of these forest lands. In recent years, there has been considerable media attention on threats to the health of this resource posed by acid rain and associated pollutants, and increases in forest pest activities. The Forest Service and many state forestry organizations have been asked to assess and provide information to determine if these threats are affecting the health of our forests. In response to these concerns, a National Forest Health Monitoring Program was implemented in New England by the Northeastern Forest Experiment Station, Forest Inventory and Analysis (FIA) and the Northeastern Area State and Private Forestry, Forest Pest Management (FPM) in Fiscal Year (FY) 1990.

The term "forest health" describes forest conditions relative to values, needs, and expectations. Forest Health Monitoring is a program designed to determine whether forest conditions are likely to meet the required values, needs, and expectations, and if changes in management are necessary. An additional, and very important benefit, is the providing of information on existing or potential problems. Monitoring can be defined as the repeated measurement or sampling of pertinent data for comparison to a reference system or identified base line. It always involves the determination of changes over time, usually interpreted against a base line. Its ultimate value comes when the information that is collected, analyzed, and interpreted is used in making management and policy decisions.

Currently, the Forest Service gathers data on the forest resource and forest pests in various ways. The two most notable activities are the periodic FIA surveys conducted on most forest lands by the two Experiment Stations and insect/pathogen surveys conducted by FPM on federal forest lands together with State agencies on State and private forest lands. The Northern Forest Health Monitoring program utilizes the expertise of these groups in a coordinated fashion, to collect, analyze, and report forest conditions. Forest Health Monitoring is an integral part of the Forest Service's Forest/Atmosphere Interaction Program proposed under the Forest Ecosystems and Atmospheric Pollution Research Act of 1988 (PL 100-521) and the Forest Stewardship Act of 1990 (PL 101-624) involving coordination with the Environmental Protection Agency's Environmental Monitoring and Assessment Program (EMAP).

Program Components

Forest Health Monitoring has three major components.

Detection: A series of plots linked to the FIA inventory system on which periodic measurements are made relating to the functioning of a forest. The plots are selected within a system of 40 sq. km (10,000 acres or 16 sq. mi.) hexagons located on a triangular grid network developed by EMAP.

The detection network will be visited annually and managed by FIA and state cooperators. The measurements conducted have been organized into indicators of forest conditions. The indicators are growth, visual symptomatology of trees, soil characteristics, foliar nutrition, vegetation structure and mortality. The measurements will be monitored to establish a base line and to detect any changes in forest condition. In addition, analyses of spatial variability can be used to determine regional forest health conditions.

Collection of non-plot information is used to possibly explain deviations of detection plot information. The non-plot information includes insect and pathogen distribution surveys, weather and climate data, pollutant deposition information, and fire frequency data. The forest pest condition reporting system will provide area-wide information on major insects, pathogens, and fire incidence and impacts to supplement data collected on the plot network. The weather, climate and pollutant deposition information will be assembled and reported by the EMAP personnel.

Evaluation: A more intensive assessment of forest health problems detected by the detection plot network, insect and pathogen surveys, or those already known to exist.

Evaluation monitoring will focus on specific forest types, tree species, and/or regions that have unexplained deviations from established base lines as identified by detection monitoring activities. The investigations will attempt to explain the specific cause and effect relationships between the deviations and forest stressors such as: insects, pathogens, weather, and climate data or combinations of the stressors. If specific cause and effect relationships cannot be determined, then identification of research hypotheses will be developed for research monitoring activities.

Research: Intensive monitoring of forest ecosystem conditions and stressors at a small number of sites to determine specific cause and effect relationships.

Research monitoring will focus on intensive forest ecosystem measurements to improve the understanding of ecosystem functions and cause and effect relationships. This level of forest health monitoring will occur on a small number of sites that represent major forest types.

Illustrated below are the detection and evaluations activities that occurred in the 20 states that comprised the Northeastern Area, State and Private Forestry in FY 1990 and FY 1991.

Detection and Evaluation Activities Occurring in the States, Forest Health Monitoring, FY 1990 and FY 1991, The Northeastern Area.

State	Detection FY 1990	Evaluation FY 1991	Detection FY 1991	Evaluation FY 1991
CT	●		●	
DE			●	
IL				
IN				
IA				
ME	●	●	●	●
MD			●	
MA	●	●	●	●
MI		●		●
MN				
MO				
NH	●	●	●	●
NJ			●	
NY		●		●
OH				
PA				
RI	●		●	
VT	●	●	●	●
WV				
WI		●		●

Program Goals and Direction

The goal of the Northern Forest Health Monitoring Program is to detect unexpected changes in forest conditions and to coordinate an evaluation of these changes at the multistate level. A secondary goal is to improve the efficiency and effectiveness of pest management and the land management decision-making processes.

The following activities are planned:

- Cooperate with all 20 northeastern and midwestern states and EMAP in establishing detection monitoring plots.
- Develop and implement a standard collection and reporting system for forest pest/fire conditions for the Northeastern Area with assistance from our cooperators, utilizing Geographic Information System (GIS) database technology.
- Develop and coordinate evaluation monitoring projects with our cooperators addressing specific forest health issues.



- Produce and report information that is useful in making management and policy decisions.
- Establish funding sources and develop budget processes to assure long-term support for detection and evaluation level monitoring conducted by the Forest Service and our cooperators.
- Hire additional forest health specialists to manage and implement this program.

Below are the FY 1990 and FY 1991 funds allocated to the 20 states that comprise the Northeastern Area, State and Private Forestry.

Allocation of Federal Financial Assistance to States, Forest Health Monitoring, FY 1990 and FY 1991, The Northeastern Area.

State	FY 1990	FY 1991	Total
CT	11,700	15,300	27,000
DE	0	40,000	40,000
IL	0	0	0
IN	0	0	0
IA	0	0	0
ME	105,550	228,450	334,000
MD	0	63,300	63,300
MA	58,460	67,400	125,860
MI	10,000	16,000	26,000
MN	0	0	0
MO	0	0	0
NH	36,750	105,450	142,200
NJ	0	48,700	48,700
NY	15,000	15,000	30,000
OH	0	0	0
PA	0	0	0
RI	4,100	23,200	27,300
VT	39,250	119,550	158,800
WV	0	0	0
WI	15,000	18,000	33,000
Total:	295,810	760,350	1,056,160

The Forest Health Monitoring Program in Fiscal Year 1990

New England Forest Health Monitoring

During FY 1990, the Northeastern Experiment Station (FIA) and the Northeastern Area (FPM) staffs, along with the six New England States (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont), cooperatively established a Forest Health Monitoring network consisting of 206 forested detection plots. Plot establishment and data collection began in June 1990 and was completed by September. FPM made a significant contribution in the planning, field manual development, training of field crews, management, and interpretation of results for detection plot measurements and data. The Forest Service also assisted with the testing and development of procedures on 40 EMAP research plots in New England and Virginia. Summaries of results will be reported in early 1991.

National Coordination and Planning

Some of the Forest Service personnel participated in the development and coordination of National Forest Health Monitoring with representatives from the Forest Service and EMAP National Planning. These activities consisted of weekly conference calls, meetings, and the development of planning documents to coordinate national planning and implementation. These activities will continue.

Pest Conditions in New England

In FY 1990, the New England States and FPM cooperated in the collection and compilation of aerial detection survey information utilizing the GIS system at the Durham Field Office.

North American Sugar Maple Decline Project

Reports of sugar maple decline in the Northeastern states and adjoining Canadian Provinces triggered the initiation within the National Acid Precipitation Assessment Program (NAPAP) in 1987. States, Provinces and Federal governments both cooperated and contributed to the various components of this Project. A formal international agreement between the Forest Service, Forestry Canada, eight States, and three Provinces was signed in 1990. A total of 168 clusters of five plots each (approximately 15,000 trees) have been annually monitored for crown condition since 1988. With the completion of the NAPAP in 1990, FPM proposed to provide financial support to continue the project. Preliminary results indicate that sugar maple conditions are generally good across the surveyed region, but localized responses to insects and drought have been identified.

Spruce-Fir Decline Project

The Spruce-Fir Decline Project was initiated in 1985 as a cooperative survey to define crown symptoms, determine trends in tree condition and map mortality of red spruce and balsam fir in New York, Vermont, New Hampshire, Massachusetts, and West Virginia. Field data was collected from 80 sites between 1985 and 1989. During 1990, data was compiled and analyzed and a final report is underway. Initial indications are that foliage loss due to branch mortality or dieback is prevalent, particularly on high elevation sites.



Maine and Vermont Hardwood Surveys

Cooperative surveys with Vermont and Maine have been undertaken to determine the condition of hardwood forests. Vermont completed an initial survey in 1986 indicating the number and volume of dead trees was not alarming and appeared similar to that reported in past surveys. During 1990, Vermont and FPM began a resurvey of 1985 and 1986 sites to determine trend. Maine's hardwood survey was initiated in 1987 with the acquisition of aerial photography. Field data was collected during 1988 and 1989. Analysis and reporting are now underway.

The Forest Health Monitoring Program in Fiscal Year 1991

In FY 1991, the Forest Service will expand state participation to include a total of nine states in the detection monitoring plot network and pest conditions aspect of Northern Forest Health Monitoring. In addition to the six New England States, Delaware, Maryland and New Jersey will be added.

The Forest Service will coordinate the North America Sugar Maple Decline Project as evaluation monitoring and report on high elevation spruce/fir conditions. The North American Sugar Maple Decline Project will collect the fourth year of crown condition data. A few additional plots may be added.

FPM will begin a process to standardize the collection and reporting of forest pest survey information across the Northeastern Area. The standardization of this information will provide useful information in support of detection plot results and interpretation. In addition, the standardization of this information will provide comparable information for other FPM reporting activities. An eastern work plan will be developed in conjunction with Region 8 FPM personnel in support of Forest Health Monitoring.

A cooperative project in Vermont will investigate the feasibility of using aerial video technology to assess forest conditions. This information will be compared with existing aerial sketch mapping in documenting forest health conditions.

The Forest Service will continue to provide support to the Maine and Vermont Hardwood Surveys. Much of this support will go to the completion of data analyses and reporting.

Illustrated below is the summary of Forest Health Monitoring Implementation for Fiscal Years 1990 through 1994 in the Northeastern Area.

Summary of Forest Health Monitoring Implementations

Monitoring Level	1990	1991	1992	1993	1994
	Accomplishments ...Targets...				
<i>...Number of states...</i>					
Detection Plot Network	6	9	14	16	20
<i>Evaluation Projects (FPM)</i>					
Sugar Maple	7	8	9	11	11
Red Spruce	5	0	0	0	0
Hardwood	2	2	0	0	0

The Forest Health Monitoring Program Outlook for Fiscal Years 1992 through 1994

- Plan for, and implement, forest health monitoring for additional states within the 20 States that comprise the Northeastern Area.
- Implement evaluation monitoring as needed.

Budget Summary 1990-1994

As illustrated below, the funding history and estimates for FPM, Northeastern and North Central Experiment Stations involvement in Northern Forest Health Monitoring for FY 1990 through 1994.

Funding History and Estimates, FY's 1990 through 1994, The Northeastern Area, The Northeastern Station, and the North Central Station.

	1990 Final	1991 Final	1992 Planned	1993 Planned	1994 Planned
<i>...Dollars in thousands...</i>					
Forest Pest Management					
Cooperative Forest Pest Action Program	0	375	1,040	1,120	1,280
Pest Conditions					
Database	120	121	130	150	150
Evaluation Monitoring	30	160	180	200	200
Plot Network Support	60	80	85	90	90
Personnel Resources	45	95	240	320	320
Subtotal	255	831	1,675	1,880	2,040
Northeastern Station	600	600	1,325	925	925
North Central Station	0	0	0	300	600
Subtotal	600	600	1,325	1,225	1,525
Total	855	1,431	3,000	3,105	3,565



Organization

Overall coordination is accomplished through an Executive Steering Committee which includes the Northeastern Area Director, Northeastern Station Director, North Central Station Director, and the National Program Manager.

Within each of the Forest Experiment Stations, the program is administered and implemented by FIA staff. The state cooperators also provide input on the program direction and implementation. For the Northeastern Area, State & Private Forestry the program is administered from the FPM Area Office in Radnor, PA. Program implementation is managed by FPM field units located in Durham, NH, Morgantown, WV and St. Paul, MN.

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